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Pregnancy Tests

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Pregnancy Tests

The mechanics of the A. Z. Test and of the Friedman Modification.

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IN 1928, Gragert, making an investigation of the various methods for the diagnosis of early pregnancy, came to the conclusion that, as yet, the chemical methods for the early determination of pregnancy were too inaccurate. On the other hand, the hormone test devised by Aschheim and Zondek was positive in 77 out of 78 pregnant women and positive in only three out of two hundred thirty-six non-pregnant controls. The urine of pregnant women, after the third week, contains an abundance of sex hormone similar to that secreted by the anterior pituitary gland. This anterior pituitary sex hormone is non-specific in that it stimulates either ovaries or testes, causing them to produce their own specific sex hormones. The testicular or ovarian hormone stimulates the growth of the sexual organs and hastens maturity. The injection of the anterior pituitary hormone or urine from pregnant women into the immature female mouse causes maturation of the follicles, massive hemorrhages resulting in the characteristic macroscopic blood points, numerous corpora lutea and atretic follicles. In the male, this non-specific hormone from the urine produces changes in the secondary sex organs, hypertrophy of the seminal vesicles, prostate and vas deferens.

Aschheim-Zondek

Aschheim and Zondek used immature mice for the demonstration of the anterior pituitary hormone in the urine of pregnant women. Five mice, weighing from six to eight grams, are each given six subcutaneous injections of pregnancy urine, varying from 0.2 to 0.4 cc. per dose, over a period of forty-eight hours. The animals are killed at the end of ninety-six hours following the first injection, and the organs are examined macroscopically and microscopically. The ovaries of the injected mice are grossly enlarged, irregular in outline, and hyperemic. On the surface one can note small hemorrhagic areas—the blood points. The accessories are also enlarged and congested in contrast to those of the control animals. Maturity of the entire genital tract is in evidence; however, only the findings of the ovary should be used to decide the pregnancy test. On microscopic section the ovary contains numerous large follicles in all stages of maturation. Massive hemorrhages are present in many of the follicles. The marked tendency towards luteinization is evidenced by numerous corpora lutea, the extensive replacement of theca and granulosa cells of many follicles by lutein cells, and the imprisonment of the ova within them forming atretic follicles.

Positive Test

A positive Aschheim-Zondek reaction, when obtained by the injection of urine into immature mice, indicates the presence of living tissue derived from a fertilized ovum. The test is therefore positive in all cases of uninterrupted intra-uterine and extra-uterine pregnancy, as well as in cases of hydatidiform mole and malignant chorio-epithelioma. The reaction is strongest during the earliest months of

gestation, becomes weaker as pregnancy approaches term, and disappears about one week postpartum. Urine obtained some time after intrauterine fetal death, missed abortion, tubal rupture or tubal abortion may no longer give a positive reaction. As long, however, as the ovum or any of its elements are alive and proliferating the test will remain positive.

Disadvantages

The Aschheim-Zondek test has certain distinct disadvantages despite its high degree of accuracy, which are:

1. One must constantly breed these mice in order to have a sufficient supply on hand for the test. When mice are twenty-four days old, they have matured and are of no further value.
2. It requires five mice for each test, and several injections into each mouse over a period of 2-3 days.
3. The requirement of time (100 hours) is occasionally a distinct disadvantage, especially in suspected cases of extra-uterine pregnancy.

Friedman's Modification

A more recent method has been brought forth which entirely eliminates these disadvantages. It is known as Friedman's modification of the Aschheim-Zondek test. It has the same fundamental reactions, accuracy, and a much simpler technic. The animal used for this test is the rabbit. A single animal is all that is necessary for each test.

The ovaries of an unmated female rabbit contain neither corpora hemorrhagica nor corpora lutea, since the rabbit ovulates only after coitus. The rabbit's sexual organs respond quickly and strongly to the pituitary hormone in the pregnant woman's urine. Any rabbit doe will do for the test providing she is more than three months old, is not pregnant, and has not had coitus within eight days of the test.

The normal ovary of a young, untreated female rabbit appears as a small bean-shaped organ. It is firm and elongated, measuring approximately one cm. in length and about one-third cm. in width. Upon close examination, one can detect several closely situated, minute, colorless, unruptured, developing follicles. After the intravenous injection of a pregnant woman's urine, the picture becomes strikingly changed. The ovaries change to a pinkish color, become soft, edematous,

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B. A. I. REPORT ON SLEEPING SICKNESS

Dr. J. R. Mohler, Chief of the B. A. I., summarizes the status of infectious equine encephalomyelitis for 1940 as follows:

No. states reporting—38.
No. horses in these states—6,560,820.
No. horses affected—16,941.
Mortality rate—25%.

Over 96 percent of the cases were reported from 22 states west of the Mississippi River; less than 4 percent in the 16 states east of the river. General incidence of the disease is calculated to have been 2.58 cases per 1000 horses and mules in affected areas. Considerable increases over 1939 were reported in the Pacific Coast states, Idaho, Nevada, New Mexico, North Dakota, South Dakota, Kansas, Iowa, and Oklahoma. Extremely high incidence occurred in a few localities in some of these states. However, the mortality rate has not changed appreciably over previous years.

A relatively small number of cases were reported as early as January and February from states still experiencing freezing weather. However, without laboratory conformation, such diagnoses must remain open to question according to present knowledge.

Oklahoma had the largest number of cases (3,115), followed in order by Missouri (2,750), Kansas (1,735), North Dakota (1,157), Iowa (1,097), and Nebraska (1,003).

That vaccination is not infallible is indicated by the fact that 129 animals were reported to have developed encephalomyelitis after the lapse of a supposedly sufficient time for immunity to have developed.

COCCIDIA

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not know all the conditions that lead to outbreaks; for example, why do feeder cattle and sheep sometimes experience severe outbreaks? Is it the concentration of the animals and the resulting increase in chances of heavy infection? Or is it partly the metabolic changes attributable to heavier feeding of concentrates that makes the hosts more susceptible? Of one thing we are certain—conditions that make for the accumulation of large amounts of feces, efficient sporulation of the occysts and easy contamination of food and drink are favorable for coccidian infection. Whatever measures will retard the creation of such conditions will reduce hazards from coccidiosis in the case of both domesticated birds and mammals.

The writer is tempted to take a little jibe at some of those practitioners who find in coccidiosis an escape from their inability to determine the cause of death or disease in particular instances. Too often the finding of a few oocysts suggests loss from coccidiosis. As a matter of fact, many species of coccidia are not severe pathogens. Then too, light infections of otherwise highly pathogenic species are usually practically innocuous. Still further, animals recovered from clinical attacks may continue to harbor a so-called chronic infection. These are concepts that may prove helpful.

PREGNANCY TESTS

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and congested. The undeveloped follicles, which normally are very small, become distended and some of the follicles project like cysts. These are filled with blood and are recognized as corpora hemorrhagica, so characteristic of pregnancy. Many of the very young follicles are unchanged, but the more mature follicles are extremely dilated. The next change seen is the transformation into lutein calls. This striking change is the basis of diagnosis in determining the presence of pregnancy. After taking a glance at a few gross specimens, it becomes an easy matter to distinguish between a positive and a negative case.

The technic consists of isolating each female rabbit in a separate cage and so having her remain until eight days have passed. Rabbits between three and five months of age and weighing at least four pounds are to be preferred. An uncatheterized morning specimen of urine from the patient is collected in a clean bottle, and if not used immediately a pinch of boric acid is added as a preservative. The urine is then tested with litmus paper and if found alkaline is acidified with acetic acid. Ten cc. of urine are then injected slowly into the posterior marginal vein of the rabbit's ear. Forty-eight hours later the rabbit is anesthetized and an abdominal incision is made. A gross examination is made to determine if the ovaries contain fresh corpura lutea or bulging corpora hemorrhagica, and if so found, the patient is diagnosed as pregnant. If the ovaries contain neither corpora lutea nor hemorrhagica but only contain clear unruptured follicles, regardlless of their size, the assumption is that the woman is not pregnant. The same rabbits may be used for subsequent tests on all negative cases.

The outstanding values of this test may be summarized as follows:

1. To differentiate pelvic tumors and pregnancy.
2. To aid in determining presence of extra-uterine pregnancy.
3. To terminate pregnancy early where organic disease exists which would threaten the mother's life.
4. To determine illegitimate pregnancy early.
5. To differentiate primary and secondary amenorrhea.
6. To aid in determining viability in threatened miscarriage.
7. And finally, there are a great many women who simply want to know whether they are pregnant, and by this test they can be informed within 48 hours instead of waiting 2-3 months for accurate information.